



## "...A SENTENCE FROM YOU ..."

## NORM ABRAMSON - ALOHA-net Inventor.



Interviewed on September 15, 2004 in Honolulu, Hawaii.

Born in [DATE] in [PLACE]

BOSTON MA 1932, *april 1*

He is a founder and first CEO of ALOHA Networks in San Francisco. From 1968 to 1998 he was a Professor of Electrical Engineering and a Professor of Information and Computer Sciences at the University of Hawaii. He has also been a member of the faculty at Stanford, Berkeley, Harvard and MIT. At the University of Hawaii he served as Chair of the Information and Computer Sciences department and as Director of the ALOHA System research project. He directed the effort at the University of Hawaii which led to the construction and operation of the ALOHANET. He has served as Consulting Expert in Communication Systems, Data Networks and Satellite Networks for the ITU (Geneva), UNESCO (Paris) and the UNDP (Jakarta). He is the recipient of several international awards including the 1995 IEEE Koji Kobayashi Computers and Communications Award and the 2000 Technology Award from the Eduard Rhein Foundation.

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1953 | Physics → Undergrad Harvard  
 1955 | Masters UCLA  
 1958 | Ph.D. - EE → AT STANFORD

- Faculty Stanford

1964 I left Stanford

64-65 - Visiting - Harvard

1966-67 - Hawaii - Tokyo, visited on mailboat

1964 I left and came back to SFO to start ALOHA NET.

Do you remember when you had your first contact with a computer?

(In SFO friends).

Jan 1953 → Harvard studying Physics. First computer HARVARD AIKEN MARK II computer.

Put time working in Systems lab - HUSE Aircraft company (CA) owner of 53.

What was your first contact/experience with Internet or ARPANET?

Notable  
 my ideas about net were mad's (maybe 1968). I year after I moved to Hawaii. We proposed for a it was an interesting thing to build. Larry Roberts needed to build an ALOHA net (when Bob got to Hawaii). In your opinion, what are the key characteristics of Internet?  
 We were the first network.  
 Telephone dialing oriented.  
 9000 hrs → we started. Always on no dialing. Connection fee.  
 If you want to send small amounts of data you have overhead.

99% of the ethernet user connection is overhead.

1 in two bytes translated for HTTP.

500 bytes for that click.

In <sup>not</sup> ratio 90% of the cost is in upstream link terribly inefficient.

### Chaos

- ① Anarchy aspects of the net. Very overregulated telecom that we've seen in the 80's. Not to have to deal with telecom lawsuits.
- ② Inefficiency of resource - 99.9% bits of protocol for 1 of info. I can't tell you any other tech. It's not for a bad design. It was there just 30 years ago for symmetrical telecom.



What do you consider the most important milestones in the development of the network?

1970-1980 - establishment of a true routing network  
1975-80 - of Internet protocols which permitted to global intern.

How did you contribute to the development of the Internet? ARPANET

- created the project which first did digital radio connect.  
- Randomly Aloha radio channels. We design and built the equipment and implementation of that.

1970 First microprocessor connected from Tel. NED WALDON  
TOM GARDNER  
DICK BINDER

Who are some key people in the development of Internet, leaders or trendsetters? Without money to build more stuff. I spent time in projects

The VNA never used the network. I used it to the central computer. To the UN.

- To [NAME] for his/her contributions to...
- To We connected to most of the major OAHU 910 ISLAND.
- Radio repeaters to cover more than 400 km.

MADI -> VNA Campus in Big Island. (UHF, pretty easy).

Two anecdotal situations

he was in SLOTTED Aloha channel.

He convinced his Boss, to send him to Hawaii (to work together).

as a paradise. He did something diff. Taking the Aloha ch. I for a diff.

CSMA/CD. He put this and won't

What do you think about the future of Internet?

Has a future, is a society changing technology.

Will increase on much in the presence of the network.

Do you see any technological trends?

Wi-Fi - brings Ethernet to Aloha. But is a single channel system

and had a lot of problems due to take the ethernet cable ideas back to radio.

ADDITIONAL READING PAPERS & BOOKS MENTIONED / RECOMMENDED

The 11Mbps is way way down below that. But is not as reliable as cable is.

Was probably as a poor design.

long distance / but portable - several.



There were

1971 - GUKbps. — SAT channel who connected us to ARPANet - Alameda.

1971 ATS-1 (Name S-1) connected to Alaska, Japan & Sidney Australia.  
Alameda Tech Sat.

### ANECDOTES

- The way in which we got the SAT ITP in Hawaii early 1970 ARPANet to grow and he had the list on his blackboard in his office. Hawaii not that list. We went off from his office and inserted Hawaii and a date 5 months later. Larry went back and I left without telling that. In Aug 26 — I had to call from Frank Heart to install it. So there — you see the perfect planning of the Pentagon.

- MERISAT was the first commercial use of an ALPHA channel they call something else they were concerned in patent issues.

IRVING GOLDSTEIN chief council of COMSAT (US representative of Intelsat) he introduced the company and all the engineers and he was with me during 2 hours. He became the CTO and president of the company. They were concerned that we were looking for money. I never was with a big lawyer of the company whom I just want to talk with a few companies.

### People

- Paul Brown, but he, original ideas of packets and routing. It was pretty natural after inventing the kind of data to (burst & random data). Make sure about the data.

Nick Waldron

Tom Gasder.

ALAN OKANAKN

In  
Hawaii